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ABSTRACT

Data collection procedures for the Beginning Teacher Evaluation Study are described. The instructional time phase of this study investigated the amount of time the teacher spent teaching particular objectives in reading and mathematics, and its relationship to student achievement. Two types of data were gathered from the second and fifth grade classrooms involved in the study: (1) daily logs or check lists, in which the teacher recorded the time spent on various areas of the curriculum, and (2) observations noted by a trained observer who spent ten consecutive days in the classroom. In addition to the data on curriculum content and instructional time, the researchers were also interested in the instructional setting: small group instruction vs. individual seatwork, teacher involvement in the learning activity, and pacing of the lessons. Thus, the amount of time spent in various types of learning activities was recorded for each of the curriculum content categories in reading and mathematics. These content categories are appended. The development and field testing of both data collection methods, and the instructions for recordkeeping are described in detail. (GDC)

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SCOPE OF INTEREST NOTICE

Instruments for the Study of Instructional Time

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Introduction

The work being conducted during 1975-76 by the Far West Laboratory on the Beginning Teacher Evaluation Study is described in the document entitled Program Plan for the Continuation of Phase III-A, BTES. Tasks II (A Study of Instructional Time) and III (Dependent Variable Battery) of that work plan involve a considerable amount of systematic data collection. This technical note describes the specific data gathering procedures associated with Task II. The design in which these procedures will be used is described in Technical Note II-1: Design for a Study of Instructional Time.

Three methods of data collection will be undertaken as part of Task II involving achievement tests, teacher logs and direct observation. The achievement tests have been developed by the BTES staff during 1974-75. Further refinement of these measures constitutes one of the major goals of the work for the current year. The battery to be used this year, its history of development and relevant pilot data are the subject of Technical Report III-1: Development and Refinement of Reading and Mathematics Tests for Grades 2 and 5. Scores on the scales included in this battery adminstered over an eight week interval will provide the major criterion variables for the Study of Instructional Time. As indicated in the design of the study, six subscales of the battery will be given to a subsample of the classes in conjunction with the direct observation. In this case, the scales will be composed of items which are logically parallel to the items in the corresponding scales of the main test battery. Descriptions of the scales included in the test battery and the specific items comprising each scale are included in Technical Report III-1.

The main purpose of this technical note is to describe the remaining two data colleciton procedures; the teacher logs and the direct observation system.

TEACHER LOGS

There are four basic purposes for collecting data via teacher logs. First, they will provide information on instructional time over an eight week period that can be analyzed as part of the Study of Instructional Time described in Tehcnical Note II-1. Second, they will allow comparisons between information obtained from teachers' records and information obtained by direct observation, also as part of the Study of Instructional Time. Third, they will yield information on the content covered in instruction over an eight week period of the 1975-76 school year. These data will be analyzed in conjunction with the refinement of reading and mathematics tests so that the reactivity of these tests to classroom instruction can be maximized (see Task III in Program Plan for Continuation of Phase III-A, BTES). The fourth purpose is to develop and refine practical procedures for obtaining information from teachers on the content and setting of instruction for different groups of students with specifications of duration of time for each setting.

Development and Pilot Testing

The log procedures to be described are the result of pilot work conducted in three year-round schools during July and August, 1975. A wide variety of procedures were considered, including many suggestions of participating teachers.

The goal of pilot testing was to have teachers try a prototype log, and, using teacher reactions and suggestions, develop a workable format for getting a maximum amount of accurate information with a minimum amount of inconvenience for the teacher. Teachers recruited for the pilot tests were told that we were trying to develop a way for teachers to record content covered in mathematics and reading for all the students in their classes so that we could relate achievement on tests items to what had been covered in class.

The first log to be tried had a checklist format. Content categories were listed and teachers were asked to indicate daily whether students had worked on the categories using the symbols N (not at all), S (some of the time - from one to five minutes), and A (any time period greater than five minutes). A relatively detailed list of categories was included. If teachers felt that we had listed too many they were asked to suggest categories which could be collapsed. In classrooms where teachers group students, logs were kept for student groups. Teachers with highly individualized programs kept one log for each of four students. In this case students were selected from the high, two middle, and low quarters of the student ability range. For the most part, these were the same students for reading and mathematics.

Six teachers, three 5th grader and three 2nd grade, from a year-round school in Hayward, California, piloted this procedure for two weeks. As they had individualized programs, the logs were kept for target students. After two weeks, about half found that keeping logs of this type took from five to ten minutes per day. The remaining teachers took longer, from ten to twenty minutes per day. With more practice and greater familiarity with the content

categories and the format, it was estimated that all teachers could complete logs in about ten minutes per day.

The procedure worked quite well in the Hayward program although it provided data on only four students per class. The teachers had several constructive comments. They found the content categories relatively familiar and easy to use. Most felt that the N notation was a waste of time and either dropped it completely, or replaced it with a dash. A few noted some teacher benefits from keeping logs; it reminded them specifically of what they were or were not covering, and the students for whom logs were being kept were pleased and motivated by the attention.

At this point, those teachers with highly individualized programs were asked to group their students and keep a weekly record of content covered for each of three ability groups. They reported difficulty in grouping students. In addition, content categories they noted as being covered, were not necessarily covered by all students in a particular group.

At an additional piloting site in Fairfield, California, teachers kept logs as described above. Two fifth grade teachers were involved in a team teaching situation. Their classes were grouped by mastery level and they found it convenient to keep the logs by student group. After these teachers kept logs for approximately ten days they asked to augment the log to reflect instructional setting as well as content covered. At this point, it became clar that information on individual students was not necessary if the class was grouped. The teachers in Fairfield suggested a log format which is a variation of a lesson plan rather than a checklist. This new format was tried and found to be quite workable. However, it was clear that the organization from class to class varies considerably, requiring that the procedure for log keeping remain flexible.

As a result of experience in these pilot classrooms we have developed a procedure for classes which use various grouping strategies, and another

procedure for classes that are highly individualized.

Procedure

All thirty 4th and 5th grade teachers participating in the continuation of Phase III-A will maintain records on their reading and mathematics instruction during the 1975-76 school year. These records are referred to as "teacher logs". The logs will provide information on the content covered and settings of reading and mathematics instruction on a daily basis for the different groups of students in each class. The duration of time for each instructional setting will also be recorded, with one or more content categories associated with each setting. In some highly individulaized classes, it may be impractical to obtain this level of detail for the teacher logs. In these cases, teachers will record the content covered for the reading and mathematics instruction of each student on a weekly basis. Information on the instructional setting and the duration of time associated with settings will not be obtained for these highly individualized classes.

The teacher log format is presented in Figure 1. Although minor modifications in format may be implemented before formal data collection begins in late September, no changes are expected for the basic categories of information to be recorded on the form. Each one page log will cover one week of instruction for a single group of students in either reading or mathematics. The names of the students in a given group will be designated on a separate page. This procedure allows for different grouping patterns in reading than in mathematics. It also allows for weekly changes in the formation of student groups. Minor changes during the week can also be noted. In addition, the maintenance of separate logs for each student group in reading and in mathematics should insure that information specific to each group is obtained.

Curriculum content will be recorded according to the list of categories

Teacher _____ Group _____ Reading ____ Math ____	Week of / /	Time:
MONDAY	content	
	adult/no adult	
	seatwork/groupwork	
	materials	
TUESDAY	content	
	adult/no adult	
	seatwork/groupwork	
	materials	
WEDNESDAY	content	
	adult/no adult	
	seatwork/groupwork	
	materials	
THURSDAY	content	
	adult/no adult	
	seatwork/groupwork	
	materials	
FRIDAY	content	
	adult/no adult	
	seatwork/groupwork	
	materials	

FIGURE 1

Teacher Log Format (reduced in size)

and the glossary found in Appendix A. Teachers will refer to the list to find the appropriate codes for the content categories that best describe the instruction received by a given group of students during a given day. The glossary will be used only to clarify the meaning of the categories listed. It is expected that the training received by teachers will clarify the categories and relate them to each teacher's conceptual framework sufficiently enough so that the glossary will be necessary only as a convenient reminder of what had been explained during training. (This training is described more completely later.) Teachers will be asked to record content at the finest level of detail that is possible. For example, rather than denote that decoding skills were covered for a given group during one reading period, teachers would be asked to record exactly which categories were covered.

Content categories will be designated according to the instructional setting in which they occur. The starting and ending time for each setting will also be recorded, thereby providing a record of the instrucional time on the content that was covered in each setting. If several different content categories are recorded for one setting, and therefore for one time period, then the teacher will specify the amount of time devoted to each category whenever it is possible to do so. Otherwise, the total period of time will be divided by the number of categories, yielding an estimated time to be alloted to each of the categories.

As described in Technical Note II-1, instructional setting for a particular content area is defined by three dichotomous facets: 1) direct involvement of an adult or no direct involvement of an adult; 2) seatwork or groupwork; and 3) large group or small group. Direct involvement of an adult covers a range of activities from lecturing a group of students to monitoring the ongoing independent seatwork of several students. Adult refers to any teacher, student teacher, or aide. No adult will be classified as directly involved in more than one setting at a time. Therefore, an adult would not be directly

involved in monitoring seatwork if that were a secondary function of the adult, as would be the case if the adult were primarily involved in leading a reading group. For the second facet, seatwork will refer to any setting where individual students are working independently. Two or more students working together or an audlt tutoring one student would be classified as a group-work setting. For the third facet, six or more students in the same setting will be considered a large group, whereas five or fewer students will be a small group.

Teachers will classify each instructional setting according to the first two facets, denoting direct involvement of an adult or no adult directly involved and denoting whether the students in the setting were doing independent seatwork or group-work. It is not necessary that teachers classify groups as large or small, because the students in each instructional setting will be designated by name on a separate list as described previously. Group size can be determined according to the number of students associated with a given setting.

In addition to the information described above, teachers will provide a brief description of the materials used in each instructional setting. This might involve the name of a text book and the pages covered during instruction, or it could consist of an attachment of worksheets used for seatwork assignments.

Content categories, descriptors of instructional settings, and descriptors of instructional materials used will be recorded on the form presented in Figure 1. Rows are designated for recording the content category or categories covered in an instructional setting, whether or not an adult was involved, whether students did seatwork or worked in groups, and what materials were used. These rows are repeated for each day of the week. At the top of the log the teacher records his name, the group of students to which the log applies (the actual list of names is on a separate sheet), and whether the log applies to reading or mathematics. Time periods for instructional settings are recorded

by the teacher at the top of the log above the rows for content setting, and materials information. The time period designations are extended across days of the week by simply drawing vertical lines down the page. In this fashion, each teacher can adapt each log to an instructional schedule for a particular reading or mathematics group.

The names of students for each log will be noted on a separate list. At the beginning of the data collection period, each teacher will have several copies of a class roster. The reading and mathematics group for every student in the class can be noted on a single roster. Minor changes, including the date of each change, can be noted on the same roster. If major changes in grouping patterns occur, the teacher simply designates the new grouping patterns on another roster, noting the final day to which the previous roster applies and the initial day of the new roster.

As mentioned previously, some teachers may individualize instruction so extensively that the log and roster procedures described above are impractical. These teachers will be asked to simply record information on the content covered in reading and mathematics for each student during each week of instruction. This can be accomplished with copies of a class roster, using one roster each week to record content covered that week, next to the name of each student.

Clearly, these procedures will be cumbersome when teachers first attempt to use them. Extensive training on the log procedures will therefore be provided before data collection begins and weekly monitoring will be provided for each teacher to deal with any problems that might arise. During the first week of September, FWL staff will meet with each participating teacher to explain the record-keeping procedures. A complete set of materials will be provided at that time, including a set of forms for logs, a list of reading and mathematics content categories with the related glossary (Appendix A), and a written description of the record-keeping procedures. All of these materials

will be explained in the first meeting with each teacher. In addition, the development of an appropriate class roster will be discussed with each teacher, so that such a roster can be developed and duplicated as soon as possible (with FWL performing duplication services). During the second and third weeks of September, each teacher will begin keeping logs as a means of practicing the procedures. FWL staff will continue meetings with each teacher as often as necessary (at least once a week) to ensure that all problems are dealt with adequately. As mentioned above, weekly monitoring will continue during the actual data collection.

Reliability

It is expected that these procedures will provide reliable and valid data for both the Study of Instructional Time and for the refinement of reading mathematics tests. One important check for reliability and validity will be the clinical information obtained by monitoring the record-keeping of each teacher. In addition, a quantitative check can be obtained by correlating log information provided by teachers in the Study of Instructional Time during the two weeks for which they are observed. The data obtained from teacher logs can be compared with observational data obtained for the same time period in the same class. The correlation of these two sources of data will provide an estimate of their comparability.

OBSERVATION SYSTEM

Data collected by direct observation in Task II has two major purposes. First, direct observation of instruction over a two week intertest period provides the basis for relating achievement over that period to the time spent in certain classes of instructional settings. Observation of all school instruction during this interval eliminates the problem arising from sampling of a few instructional occasions from a relatively long intertest interval. The observation system is intended to capture all instruction relevant to mathematics and reading in terms of time-in-setting variables which could then be related to achievement measures. The second purpose of the observation system is to provide independently collected data to compare with the time-in-setting data obtained from teacher logs. Although there is some conflict inherent in serving these two purposes, in the main neither purpose has been severly compromised in devising a procedure. The most difficult problem in developing an observation system is selecting the level of specificity with which to describe the phenomenon. The usefulness and practicality of a setting can vary tremendously depending upon the number of facets involved in its definition. In the BTES we are interested in the impact of particular teacher behaviors and skills on student performance. However, a teacher skill is not likely to have the same impact in grossly different instructional settings. The implication of this line of thinking is that at least some teacher behaviors must be studied within instructional settings. The first step in this direction calls for the collection of data on instructional settings. Task II addresses precisely this problem. The observational system must serve both purposes of Task II (as a source of process data which could be related to student achievement and, as a data base against which to compare the teacher log data) and in addition, provide a basic framework within which to collect data on specific teacher behaviors.

The question of which level of specificity to choose in describing instruction bears further comment. Since the measures of cognitive learning most often used in evaluating instruction are differentiatied by subject matter, it seems reasonable that the instructional process should also be studied within content areas. Clearly reading achievement is much more likely to be related to instruction on reading than on other school subjects. However, reading in itself is composed of many skills and the diversity of content of instructional activities in reading bears this out. Now the question arises how detailed should the description of content be? Presumably a match between the content covered by the achievement measures used and content categories used in describing instruction would be most desirable. Even so, it is still possible to match the tests and observation data but vary the specificity of the categories. In addition, the more specific the categories the more difficult the coding of process data for all of the students in a classroom. In this case perhaps target students should be observed rather than all of the students in a class. However, collecting data on target students presents problems as well. For a constant amount of research resources the decision is between more specific information for a smaller number of students or less specific information on a larger number of students. The content facet illustrates this resolution versus field of view problem well but a similar dilemma exists for other facets of instruction.

The decision in this case, is to describe instructional settings at a relatively global level in terms of three dichotomous facets (teachers involvement, pacing, and group size) and within these settings to note the content covered in relatively specific categories. The observation system is designed to collect time-in-setting data and within these settings to code content for all instruction in reading and mathematics.

Development and Pilot Testing

During July and August, 1975, FWL staff visited teachers at grades 2 and 5 in year-round schools operating in Fairfield, and Hayward, California. The first attempts at coding content for individual students uncovered several difficulties. We began by trying to code content in reading and mathematics in the categories listed in Appendix A. These categories are the result of a logical analysis of the curriculum materials most frequently used in California at these grade levels. Our first difficulty arose as a result of an incompatability between the level at which content was coded and the level at which setting facets were being coded. Originally we coded seatwork as one of the elements of a student activity facet but it soon became clear that several content categories would be included in any one session of seatwork. For example, teachers handed our seatwork dittos which included work on several kinds of decoding and word structure. Clearly the amount of time spent on each content category by each student was impractical to record. After trying several alternatives, this problem was resolved by redefining the content categories for the observation instrument. The basic categories are presented in Appendix A. Redefinition resulted in keeping two of the narrow categories from Appendix A and collapsing the others into four new categories. The reading content categories to be used for observation are:

R1 - long vowels
R2 - other decoding
R3 - compound words
R4 - other word structure
R5 - comprehension
R6 - other

The R1 category includes categories I-5 (vowels - final e pattern) and I-6 (vowels - digraphs); R2 corresponds to the remaining original categories of decoding (I-1, I-2, I-3, I-4, I-7, I-8, I-9, I-10, I-11, I-12, I-13, I-14); R3 corresponds to category III-1 (compound words); and, R4 to the remaining

word structure categories (III-2, III-3, III-4, III-5, III-6, III-7); R5 corresponds to all of the subcategories under context clues (II-1 through II-6), word meaning (IV-1 through IV-8), comprehension (V-1 through V-10), and categories VI-1 through VI-9 of application. R6 includes application categories VI-10 through VI-12 and all of the reading related categories (VII-1 through VII-3). The new categories (designated R) are quite different in their specificity. The narrower categories will provide an opportunity both for comparison to teacher logs and for analysis of student achievement data. Students will be tested separately on content covered by categories R1, R2, and R3. The R5 and R6 categories are very broad and may appear to be of little value. However, there is little reason to expect large changes in comprehension over a two week period so for the prupose of this study these categories were left intentionally broad.

The mathematics content is somewhat easier to deal with in the classroom in that it is hierarchical in nature. If a student is working on multiplication, then certainly he must be able to do addition. Because of this kind of content dependency, students tend to work on relatively easily categorizable activities. Since the observation covers a two week period in the fall of the year, we have restricted our attention to a few narrow content categories (for which test scores will be available), and collapsed the other content areas into one broad category. The categories chosen for mathematics are:

M1 - addition without regrouping
M2 - addition with regrouping
M3 - subtraction without regrouping
M4 - subtraction with regrouping
M5 - place value and expanded notation
M6 - other

These categories focus on the computation area which is taught most frequently during the early part of grade 2 and on one conceptual area (place value and expanded notation).

This collapsing of some content categories and focusing of others makes the observation much more practical but it does not solve all of the problems. From our experience in piloting it is still the case that content changes rather more quickly than the setting variables (for example group size or teacher involvement). Instead of trying to get a perfect fit between content categories and the setting variables we chose to allow more than one content designation for any particular combination of setting descriptors.

The setting descriptors were reduced to three: teacher involvement, pacing, and group size. For the present investigation these facets of setting have been kept as simple as possible, that is, they are each considered to be dichotomies. Either the teacher has direct involvement for a student or group of students or he does not. For instance, suppose the teacher has the class divided into two activity groups: a reading group led by the teacher; and a group of students doing seatwork. For all of the students in the reading group the instructional setting is characterized by the direct involvement of the teacher, while the setting for the remainder of the students is characterized as not having a teacher directly involved. The status of the second group would not change even though the teacher occasionally answered questions for students in the seatwork group. If the teacher is primarily focusing on the instruction of the reading group, then only that group would be coded as being in a setting with a teacher directly involved. However, if the whole class were doing seatwork and the teacher's primary activity was monitoring students for the purpose of giving feedback and explanation then the setting would be coded as having a teacher directly involved. Teacher, in this case, is being used to include any adult. In many classes student teachers and aides engage in direct instruction of students and for coding purposes no distinction will be made. This facet will be coded by using "T" to represent cases where in the teacher

has direct involvement and "N" for all other cases.

Instructional settings are differentiated in terms of pacing. We want to distinguish between situations where each student controls the pace at which his work proceeds and situations where the students does not control the pace. The vast majority of cases where the student controls his own pace occur in independent seatwork. Analogously, group work is the situation most frequently encountered when the student does not control the pace of instruction. These two categories (seatwork and group work) are used to operationalize the pacing facet. Seatwork is coded as S and group work as G.

Finally, settings are differentiated in terms of group size which has a somewhat indirect effect on instruction. Small group size by itself does not necessarily imply radically different instruction. However, some of the techniques advocated for effective instruction require relatively small groups of students and ideally require treating students individually. Group size is treated here in a simple way. Small groups are defined to have five or fewer students, settings with six or more students working together are designated as large groups.

The basic strategy of the system is to code all instruction in mathematics and reading for each student in a classroom. This is done by tracking the time students spend in particular settings in terms of teacher involvement, pacing, and group size and subsequently coding the content covered within each setting. For each of these time-in-setting events one or more specific reading and/or mathematics content categories are recorded. In cases where more than one content category is coded, for analysis purposes time will be equally distributed among them.

Experience during piloting indicates that one observer can keep track of this information for classes of thirty students. However, it is essential that

the observer know the general routine of the classroom, the materials that are used for mathematics and reading and also be able to distinguish one student from another rapidly. These conditions are met by having an observer spend a minimum of two full days in a particular class before data collection begins. This procedure allows the teacher and students to become accustomed to having the observer and allows the observer to practice in this particular classroom.

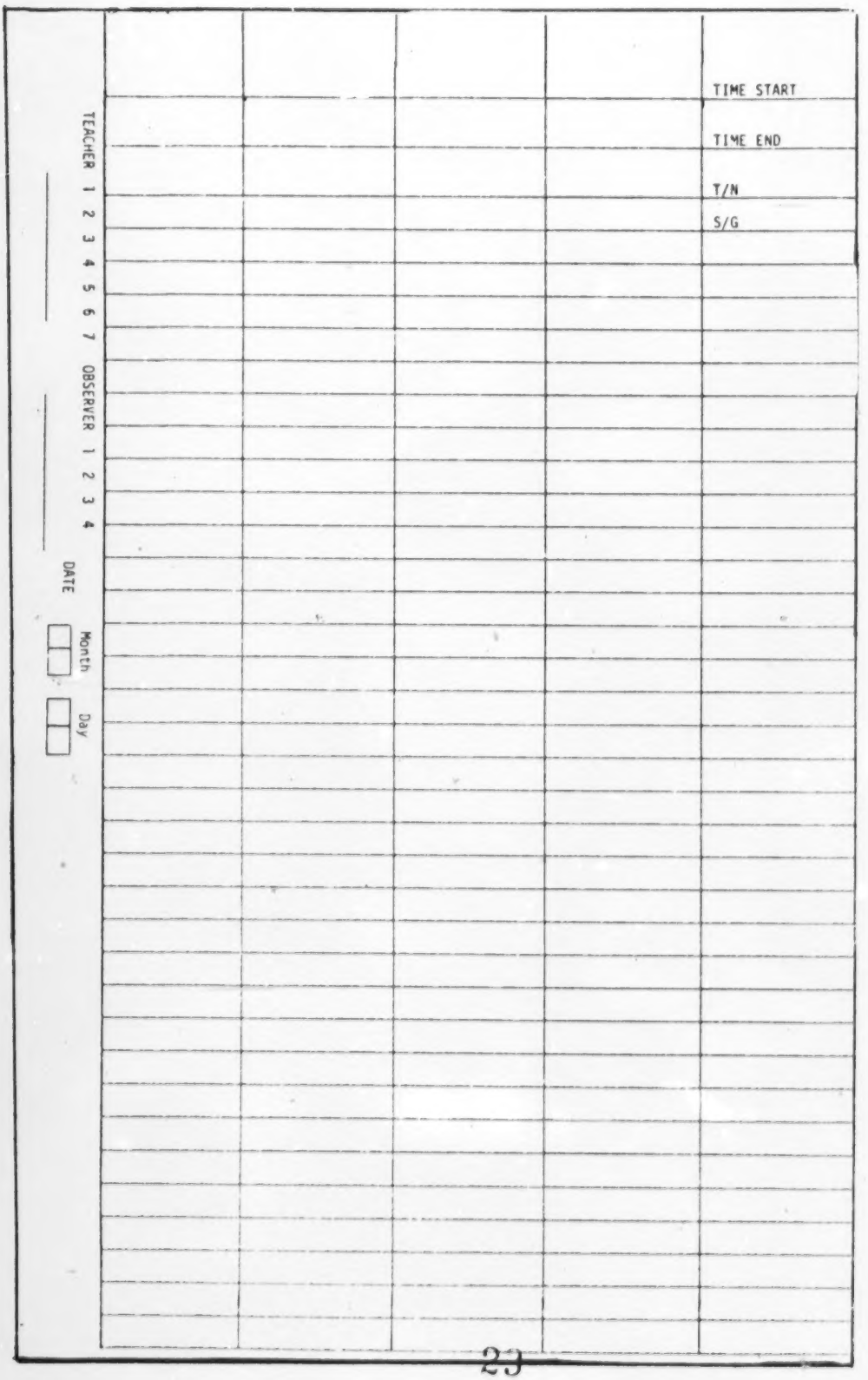
The Data Collection Procedure

The observer will collect data for 10 consectuive days in a particular classroom. Once the observer is familiar with the general classroom organization and the students the procedure is straight forward. The familiarization will be accomplished before the official data collection period. The observer will enter the classroom with the students each morning and use the observation form (Figure 2) to code the settings. The coding form for use in the field is 8 1/2 inches by 14 inches. The form has been considerably reduced in size for display in Figure 2. Note that each student's name heads a column. Four additional columns are provided. These columns are to be used when group settings occur. Two columns are intended for the start time and the end time of a group setting; the other two are for teacher involvement and pacing respectively.

The form is used in the following way. The observer notes the start time for any group setting wherein mathematics or reading is the content. All times are recorded to the nearest minute. Teacher involvement and pacing for each group are coded in the appropriate columns. Finally, the content is coded in the cell below the name of each student in that setting. If the content is the same for all students in that setting, then the content is coded for the student appearing first in the list and an "x" is placed in the appropriate cell for each of the other students in that group. This indicates that the content code is the same for all students in that group. In the simple case where that setting comes to an end, at a particular time for the whole group, the end time is recorded. If some students in that setting cover different categories of content, then those categories are coded under the names of appropriate students. If one or more of the students in a setting leaves that setting, then the end time is entered in the cell for that student directly under the content code. In this way all students who started out in the same

FIGURE 2

Observation Form
(reduced from 8 1/2 x 14)



setting can leave it at different times and still be accounted for. If a student enters an existing setting after it starts, then the observer codes that student's start time under his name and then codes the content. Thus, if a cell for a particular student begins with a time then it implies that the group time entered in the far left column does not apply to this student. If the last entry in a cell for a particular student is a time it implies that he left the group before it ended and the end time for the setting (second column from left) does not apply for this student. Similarly, if a student starts off in setting A, changes to setting B, and then returns to setting A again, this can be coded. The cell under the student's name might contain a content code, a time, another time, a content code, and a third time. This would represent a case where the student started the setting with the whole group and was working on the content listed first. This work continued until the first time listed in his cell, at which point the student changed to another setting. At the second time listed in the cell the student returned to the first setting and worked on the content listed next in the cell. The final time recorded in the cell represents the point at which the student left the setting again, and in the example being considered the setting continued to exist after the student's second departure. The time during which the student was not in the setting being discussed could probably be accounted for by looking in another row on the form (that is, in another setting). However, if the interim setting did not involve reading or mathematics then no entry would have been made for that time interval. Each row on the form represents a setting as defined by teacher involvement and pacing. Several rows may be active at any one time. Content and information which is associated with individual students (as opposed to groups) is recorded in the columns of the matrix under the names of particular students. In this way, one observer can keep track of the students in the class. Note that when a student is working on content which is not recordable as one of the

categories of reading or mathematics, no codes are recorded.

Group size is not explicity included in the set of codes. However, the group size for any student can be recovered from the codes already described. For a particular student at a partiuclar time, one can determine group size for the setting by examining the row in which the student is included. This is accomplished by counting the number of students in the row at the same point in time. For analysis pruposes group size will be considered a dichotomy; small groups are defined to have five or fewer members, large groups have more than five members. However, since the exact group sizes are available, this cutting point could be easily changed for additional analyses.

The space at the right of the sheet is for comments or clarifications as they are required. Forms with the names of students will be printed for each class. The name of the teacher, name of the observer, and date of observation are also identified on each form. In carrying out the observation routine, it will be necessary for the observer to move about the room in order to look at the materials being worked on by students. Experience has shown that the content coding requires thorough knowledge of the materials actually being used by students. This is especially true in cases where the program is highly individualized.

At the end of each observation day, the data on the observation form will be transferred to standard computing coding sheets by the observer. In this way a set of events is generated for each student describing his mathematics and reading instruction for the day. Each even will include five pieces of information: content, teacher involvement, pacing, group size, and time in that setting, (e.g., R1, T, G, 15, 24). The data that are returned to the FWL for processing will be a series of these event codes in the temporal order in which they occured during one day of instruction. This information will be obtained for each student in the classroom for ten consecutive days of

instruction.

Reliability

Reliability will be established before data collection begins. The Task II observation involves six classrooms. This work will be carried out by FWL staff members. Training for observation will be conducted during the second and third weeks of September. During this time, the three observers will train in grade 2 classrooms which are not involved in Task II. After training, the observers will independently code one day of instruction and transform the codes for each student observed to the event format described above. Reliability will be reported in terms of average interobserver correlations for each of the time variables. It is expected that coefficients generated in this way will be above 0.80.

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APPENDIX A

Content Categories and Glossary

READING CONTENT CATEGORIES

I. DECODING (Letter-sound correspondence)

1. Single consonants
2. Consonant blends and digraphs
3. Variant consonants (c, g)
4. Vowels - short
5. Vowels - final e pattern
6. Vowels - digraphs
7. Vowels - dipthongs
8. Vowels - vowels + r (car)
9. Complex, multisyllabic
10. Silent letters
11. Sound substitution tasks
12. Sight words
13. Automaticity of word recognition
14. Other

II. CONTEXT CLUES (Fill blanks, predict)

1. Choosing word(s) which fit grammatical context
2. Choosing word(s) which make best sense (semantic appropriateness)
3. Choosing correct form of word
4. Choosing word with correct initial consonant
5. Choosing correct pronoun
6. Other

III. WORD STRUCTURE

1. Compound words
2. Identification of root words
3. Prefixes - meaning and use
4. Suffixes - meaning and use

(III. WORD STRUCTURE - Continued)

5. Contractions
6. Syllables
7. Other

IV. WORD MEANING

1. Synonyms
2. Antonyms
3. Vocabulary building
4. Pronoun reference
5. Multi-meaning words in context
6. Unfamiliar words in context
7. Figurative language
8. Other

V. COMPREHENSION - TEXT

Understanding -

1. Event detail
2. Description
3. Relationships
4. Main idea
5. Literal recall
6. Translation of ideas
7. Synthesis of ideas, inference
8. Going beyond the text, prediction
9. Recognizing facts and opinions
10. General comprehension

VI. APPLICATION

1. Understanding directions
2. Picture interpretation to aid comprehension

(VI. APPLICATION - Continued)

3. Dictionary skills
4. Reference sources in books (table of contents, index, glossary)
5. Choosing reference sources (dictionary, encyclopedia, card catalog)

Understanding

6. Signs
7. Letters
8. Maps
9. Graphs
10. Reading for different purposes
11. Oral reading skills
12. Reading for enjoyment

VII. READING RELATED

1. Spelling
2. Grammar
3. Creative writing

READING GLOSSARY

I. DECODING (knowledge and use of letter-sound correspondence)

1. Single consonants -
   Sounds of single consonants in any position in a word.
   Examples: b,c,d,...

2. Consonant blends and digraphs
   Blends include st, bl, tr,...
   Digraphs include ch, sh, th, wh.

3. Variant consonants
   A comparison of several sounds possible for a single consonant.
   Examples: "c" in cat vs city, "g" in goat vs giant

4. Vowel - short
   Regular short sound of a, e, i, o, and u

5. Vowel - final e pattern
   Long vowel sound when word ends with e, as in rope

6. Vowel digraphs
   Include ee, ea, ai, oa, and ay

7. Vowel dipthongs
   Include oi, oo, ou, oy, au, and aw

8. Vowel plus r
   Vowel sound modified by following consonant r
   Examples: ar, er, ir, or, ur, air, ear

9. Complex, multisyllabic
   Decoding of multi-syllabic words, includes internal patterns, syllable influence on vowel decoding

10. Silent consonants
    Letters which are not sounded in a word
    Examples: comb, knit

11. Sound substitution tasks
    Substituting one sound for another to create a new word.
    Example: fan, _an, p, pan

12. Sight words
    Recognition of common words, especially function words (the, of, to, would, could, were) and words with irregular spelling (are, come, put)

13. Automaticity of word recognition
    Practice to improve speed of word recognition, so that the process becomes automatic.

II. CONTEXT CLUES

Context clues involve using the context of a phrase, sentence, or story to help identify a word or to predict a missing part. Different types

of context clues emphasize different aspects of the linguistic context or of the word to be identified.

1. Choosing word(s) which fit the grammatical context.
   Father is sleeping _____ the bed.
   night
   in
   warm

2. Choosing the word(s) which make best sense in the blank.
   The _____ lives in the royal palace with her father.
   princess
   prince
   sister

3. Choosing the correct form of a word.
   Both of the _____ are asleep.
   baby
   babying
   babies

4. Choosing the word with the correct initial consonant.
   Don't _____ the milk.
   sill
   spill
   still

5. Choosing correct pronoun.
   John dropped his book and then picked _____ up.
   them
   it
   him

III. WORD STRUCTURE

1. Compounds
   Words formed by combining two smaller words - "mailbox"

2. Identification of root words
   Recognizing the root word in a derived form - "playing" root = play

3. Prefixes -
   Include re-, un-, dis-, pre-...

4. Suffixes
   Include grammatical endings like -s, -ed, and -ing and other suffixes like -ly, -ful, -ness, -less...

5. Contractions
   do not = don't

6. Syllables - separation of a word into sound units preamble = pre am ble

IV. WORD MEANING

1. Synonyms
   Identifying words with similar meanings - quick = fast

2. Antonyms
   Identifying words with opposite meanings - large vs. small

3. Vocabulary building
   Learning word meanings

4. Pronoun reference
   Identifying the referent of a pronoun.
   "John washed his car." his=John's

5. Multi-meaning words in context
   Identifying the specific meaning of a word in a particular context.
   I cut my hand on a piece of paper.
   a. part of a clock
   b. part of a person
   c. give something

6. Unfamiliar words in context
   Deducing the meaning of an unfamiliar word through its use in context.
   The car was so badly entrenched in the mud that we had to call a tow truck.
   a. stuck
   b. built
   c. dirty

7. Figurative language
   Recognizing the meaning of a word or phrase used in a nonliteral sense, including simile, metaphor, and idiomatic expressions.
   The soldier fought like a tiger to protect his home.
   a. in a striped uniform
   b. with sharp claws
   c. bravely and fiercely

Oh, how Peter wished he could whistle! Peter saw his friend Sam playing with a dog. Whenever Sam whistled, the dog ran straight to him. Peter wished he could do that trick with his own dog, Willie. Peter tried and tried to whistle, but he just couldn't.

Peter went into his house and put on his father's old hat, to make himself feel more grown-up. He looked into the mirror to practice whistling. Still no whistle!

The next day Peter went outside to play. He sat on the front steps and tried to whistle. Then Peter saw his dog coming. Quick as a wink, Peter hid behind the stairs. He wanted to surprise Willie with a whistle. Peter puffed up his cheeks. He blew and blew and blew. Suddenly, out came a real whistle. Willie stopped and looked around to see who was making the noise.

"It's me," Peter shouted. He jumped out from behind the stairs. Willie raced straight up to him.

The following illustrations refer to the story above.

V. COMPREHENSION

1. Understanding event detail. What did Peter put on?

2. Understanding description - Where did Peter hide?
   How did Peter feel at the end of the story?

3. Understanding relationships - What happened first?
   Why did Willie stop and look around?

4. Understanding the main idea - What is the story mostly about?
   What lesson can we learn from the story?

5. Literal recall - recall of information exactly as stated in the story.
   What did Peter wish he could do?
   a. have a dog
   b. whistle
   c. go to school

6. Translation of ideas
   Recognizing ideas stated in different words; ability to paraphrase; recall of information when ideas are restated.

   What happened when Sam whistled?
   a. Peter went over to see Sam
   b. A dog went over to see Sam
   c. Peter whistled too

7. Synthesis of ideas, inference
   Ability to integrate information from different points in a text; understanding ideas directly implied by a text.
   What trick did Peter want to do with his dog?
   a. teach Willie to whistle
   b. put an old hat on Willie
   c. whistle to call Willie

8. Going beyond the text, prediction
   Relating the text to one's own knowledge and experience; supplying from experience information not directly given in a text. Includes predicting what might come next in a story.
   How did Peter feel when Willie came running?
   a. happy
   b. scared
   c. mad

9. Recognizing facts and opinions
   Evaluating statements and the basis for their acceptance. Included evaluating the qualifications of a speaker.
   Which of the following is a <u>fact</u> rather than an opinion?
   a. The Etruscans built cities long ago.
   b. The jewelry made by the Etruscans was the most beautiful ever made.
   c. Historians do not know as much as archeologists do.

10. General Comprehension
    Silent reading or general reading practice, where comprehension involves a mixture of the facets above: (Please use one or more of the specific categories, if possible.)

MATHEMATICS CONTENT CATEGORIES - GRADE 2

I. COMPUTATION

1. Addition (sums to nine)
2. Addition (sums 10 to 18)
3. Addition (sums greater than 18 without regrouping)
4. Addition (sums with regrouping)
5. Subtraction (two one-digit numbers)
6. Subtraction (one digit from a two-digit number which is no greater than 18)
7. Other subtraction without regrouping
8. Subtraction with regrouping
9. Multiplication (two one-digit numbers neither greater than five)
10. Multiplication (two one-digit numbers only one of which is greater than five and less than ten)
11. Number sentences involving equalities and inequalities
12. Family of facts (renaming numerals)

II. CONCEPTS

1. Number systems
2. Place value, compact and expanded notation
3. Fractions
4. Properties
5. Money
6. Linear measurement
7. Measurement concepts
8. Geometry (figures/curves/points)

III. WORD PROBLEMS

IV. OTHERS

1. Number patterns

MATH GLOSSARY - GRADE 2

A. Number sentences: equalities and inequalities
Determining what sign is missing in an equation or number sentence. Primarily involving the signs of $>$, $<$, and $=$. But may also involve + and -.

Examples: $5 \bigcirc 4$
$2 + 1 \bigcirc 3$
$3 \bigcirc 4 = 7$

B. Number patterns
Emphasis is on completing the pattern and/or discovering the rule. May ask "What is the next number?" or "What rule did you use to find the missing number?"

Examples: a. 2, 4, 6, ?, ?, 12 (series)

b.

2	3	4	?	?
4	6	?	?	12

(input/output function)

c.

4	?	10
3	5	?
?	11	18

(magic squares)

d. [(1,3) (2,4) (?,5) (?,?)] (set of number pairs)

C. Properties
Situations often arise in the teaching of basic facts, computation, etc. where particular items may illustrate certain basic properties. However, for the log, we are interested in lesson segments where attention is given or drawn to a particular property or the lesson involves a series of computational items which involve application/use of a property.

1. Commutative (order): emphasis or attention at this stage is focused on the reversability of order.
Examples: $2 + 4 = 4 + 2$
$3 \times 2 = 2 \times 3$
or $6 + 1 = 7$, $1 + 6 = 7$ (when these equations appear together and attention is drawn to reversability)

2. Associative (grouping): manner in which numbers are grouped does not affect sum.
Examples: $(2 + 3) + 5 = 5 + 5$
$2 + (3 + 5) = (2 + 3) + 5$
or can be combined with expanded notation:
$78 + 2 = 70 + (8 + 2)$
$= 70 + 10$
$= 80$

$38 = 30 + 8$ so
$38 - 5 = (30 + 8) - 5$
$= 30 + (8 - 5)$
$= 30 + 3$
$= 33$

3. Inverse: Addition is inverse of subtraction.
   Examples: 13 + 1 = 14
             14 - 1 = 13

$$\begin{array}{r} 91 \\ -47 \\ \hline 44 \end{array} \qquad \begin{array}{r} 44 \\ +47 \\ \hline 91 \end{array}$$

4. Identity elements: zero for addition and subtraction, one for multiplication.
   Examples: 3 + 0 = 3
             4 - 0 = 4
             1 X 6 = 6

D. Family of Facts (renaming numerals, equation form)

Example: Given 2 addends and a sum, write all the equations possible.

3 + 2 = 5 5 - 2 = 3
2 + 3 = 5 5 - 3 = 2

Write n equations renaming the numeral 7.

4 + 3 = 7 9 - 2 = 7
5 + 2 = 7 8 - 1 = 7 etc.
6 + 1 = 7 10 - 3 = 7

MATHEMATICS CONTENT CATEGORIES - GRADE 5

I. COMPUTATION

1. Addition of whole numbers
2. Subtraction of whole numbers
3. Multiplication of whole numbers
4. Division of whole numbers
5. Addition of fractions
6. Subtraction of fractions
7. Addition and subtraction of decimals

II. CONCEPTS

1. Place value of whole numbers and decimals
2. Properties
3. Factors and prime factorization
4. Metric geometry (perimeter, area, and volume)
5. Non metric geometry (lines, plane geometric figures)
6. Line and bar graphs
7. Number pairs on number plane
8. Number patterns and function rules
9. Word problems (1 and 2 step)

MATH GLOSSARY - GRADE 5

A. Number patterns

Emphasis is on completing the pattern and/or discovering the rule. May ask "What is the next number?" or "What rule did you use to find the missing number?"

Examples: a. 2, 4, 6, ?, ?, 12 (series)

b.

2	3	4	?	?
4	6	?	?	12

(input/output function)

c.

4	?	10
3	5	?
?	11	18

(magic squares)

d. [(1,3) (2,4) (?,5) (?,?)] (set of number pairs)

B. Properties

Situations often arise in the teaching of basic facts, computation, etc. where particular items may illustrate certain basic properties. However, for the log, we are interested in lesson segments where attention is given or drawn to a particular property or the lesson involves a series of computational items which involve application/use of a property. (This doesn't include lessons where the main focus is on memorizing the names and definitions of the properties--application or use is what we're interested in whether or not the students know the names of the properties.)

1. Associative (grouping):
   $8 \times (2 \times 5) = (8 \times 5) \times 2$
   $6 + (5 + 4) = (6 + 4) + 5$

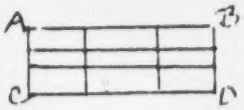
2. Commutative (order):
   $A + B = B + A$
   $A \times B = B \times A$

3. Distributive: Multiplication is distributive over addition.
   $5 \times 7 = (5 \times 5) + (5 \times 2)$
   $4 \times (8 + 5) = (4 \times 8) + (4 \times 5)$

4. Inverse: Addition and subtraction are inverse operations as are multiplication and division
   $18 - 3 = 15$ $\quad$ $3 \times 6 = 18$
   $15 + 3 = 18$ $\quad$ $18 \div 3 = 6$
   $18 \div 6 = 3$

5. Identity elements: Zero is identity element for addition and subtraction and one is the identity element for multiplication and division.
   $99 + 0 = 99$ $\quad$ $99 \times 1 = 99$
   $99 - 0 = 99$ $\quad$ $99 \div 1 = 99$

C. Recognition of area and volume refers to applying concept and "counting" units illustrated rather than the use of a formula.



What is the area of the rectangular region ABCD?